

KNOWLEDGE, POWER, AND UTILITY

FRANCIS BACON hopefully identified the ends of natural science and the ends of man. His vision of a new release of human energies in re-making the world more nearly to the heart's desire was of a kind to inspire enthusiasm. Deeming knowledge power, he eagerly expected the future to tell a story of human improvement. Man need no longer submit helplessly to a blind and indifferent nature; but, armed with inductive methods, he could bring her under control by adapting her routines to his purposes. With the power of control goes the promise of alleviation of human suffering. And so Bacon, hopefully, confidently, urged the scientific advancement of learning because of its utility in the promotion of man's well-being.

Without rhetorical adornments, this thesis, that human progress inevitably must accompany or follow scientific advance, fails to command unhesitating assent. There seems no obvious reason for believing that a knowledge of nature's ways involves either adequate wisdom or sufficient motivation for the best use of the power to which natural knowledge admittedly contributes. It is true of course that every one of us in the West owes a debt of gratitude to the scientific guidance of medicine and engineering (to mention only the most obvious things). But the military and political history of our half-century has also taught fear of the destructive potentialities of all types of modern science, from physics to psychology and sociology. It has taught us to be gravely suspicious of the philosophy of history implied in the idea of progress. To believe that the course of human affairs, viewed

over a sufficiently long interval of time, is progressive, is probably more difficult today than at any time in two hundred years. The great expectations attending the discovery and exploitation of new technical powers have been tempered by suffering. Experience has taught us skepticism, as speculative criticism alone cannot. It is no longer easy to believe that human affairs will prosper as science advances; for who can say that human affairs will prosper, with or without further mastery of the forces of nature?

In this predicament the easily uttered admonition to use science wisely offers slight consolation. If our most assured knowledge affords scant guidance, whither shall we turn for the sorely needed wisdom? And what if our darkest doubt gains voice and whispers that perchance science is not so socially a neutral instrument of human purposes, that by its very nature it tends to stifle wisdom, while fostering new and uncontrollable evils? Like the Frankenstein fantasy, this pictures the master's enslavement by his own artifact. Some such fearful suspicion cannot be said to have been wholly absent at any time from men's minds. It has formed a popular topic for moralizers who are fond of deploring the "Machine Age." But seldom has science been so uncompromisingly charged with major social ills as in a recent book by Aldous Huxley, *Science, Liberty and Peace* (1), published shortly after the end of the war.

Nobody would expect the author of the *Brave New World* to commend the social tendencies of modern technology. That satire of industrial utopia represents men, who had been artfully deprived of their essential humanity, as ant-like or machinelike workers, perfectly exemplifying the ideal of industrial efficiency. The thesis of the later work, that "Progressive science is one of the causative factors involved in the progressive decline of liberty and the progressive

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centralization of power, which have occurred during the twentieth century," expresses the deeper insight that man, de-humanized, is inhuman rather than non-human, demonic rather than mechanical. He suspects science of necessarily contributing to the creation of an inhumane society, in which the development of our spiritual capacities grows increasingly difficult.

When he observes the current scene, science and technology strike him as placing greater and greater power into the hands of a few. Plain men cannot hope to challenge it. What can they oppose to the new, technically advanced and enormously effective instruments of coercion and indoctrination? The natural disposition of individuals to resist tyrannous encroachments upon their liberties has at the same time been undermined, as increasing numbers find themselves dependent for their livelihood, in agriculture as well as in industry, upon large-scale methods of production and distribution. Consider, moreover, the human organism. Like others, it has its native rhythms, and these set intrinsic limits to the rate at which it can change its mode of life. The current rate of technological and social change exceeds this rate. Our organic ability to adjust habits of life to new ways, places, people is unequal to the imposed task; so that our society is kept in a state of chronic instability and insecurity. The net result, according to Huxley, is a general lack of moral, social, and economic equilibrium.

Huxley thus charges science with direct complicity in creating major ills of the present age. He seems to wish to say that this complicity is in some way a consequence of the *nature* of science. Yet he does not wish to imply that science could under no conditions have been employed for other ends. What he has in mind is, as he explains, that men of science begin by ignoring all that does not lend it-

self to measurement and to explanation in terms of antecedent causes, and that this habit of mind, reinforced by success in mastering the energies of nature, tends to extend itself over the whole range of human life, and to discount as unreal the qualities and values which remain inscrutable to its abstract understanding. Because of the subject matter, methods, and attitudes appropriate to its investigations, science tends to encourage preoccupation with power rather than value. This is the ground of its natural complicity in the production of social evils. If this tendency is checked, Huxley thinks it will be the result of saintliness working against the natural inclination of that powerful knowledge which commands the material energies of the world. Knowledge of the scientific sort is indeed power. "But power is not the same thing as insight."

We point the contrast, and gain perspective, by listening for a moment to Henri Poincaré, who combines the experience of a creative mathematician with a truly Gallic gift for lucid thought and apt expression. Asserting that science is concerned with means, never with ends, he concludes "there can no more be immoral science than there can be scientific morals." (2) In a general way, Huxley could agree. No doubt, the sole and sufficient legitimate aim of science is the ascertaining of truth; the employment of scientific discoveries for the advancement of other human purposes answers to criteria that lie outside the competence of the scientist, in his capacity as scientist, to discover. Beyond this point, however, disagreement begins between them, and the significance of Huxley's discussion emerges. Poincaré pays comparatively little heed to the side of science that the instrumentalists, among others, stress; he makes little allowance for the widespread and penetrating influence of scientific technology on the circumstances of

life in the great nations. It, therefore, hardly occurs to him that the pure scientist shares responsibility for some of the least agreeable of those circumstances. This readiness to circumscribe the field of science springs, of course, from no mean inclination to belittle the scientific activity. On the contrary, it reflects Poincaré's view of life's high purpose: "The search for truth," he says, "should be the goal of our activities; it is the sole end worthy of them."⁽³⁾ Thinking of knowledge in terms of truth rather than power, he could scarcely be expected to have anticipated an attack like Huxley's. The notion that science could be among the causes of diminished human welfare might have seemed not only distasteful but absurd. For is not truth the sole end worthy of our activities?

When I speak here of truth (he explains) assuredly I refer to scientific truth; but I also mean moral truth, of which what we call justice is only one aspect. It may seem that I am misusing words, that I combine thus under the same name two things having nothing in common; that scientific truth, which is demonstrated, can in no way be likened to moral truth, which is felt. And yet I cannot separate them, and whosoever loves the one cannot help loving the other. To find the one as well as to find the other, it is necessary to attain absolute sincerity. These two sorts of truth when discovered give the same joy; each when perceived beams with the same splendor, so that we must see it or close our eyes. (⁴)

Dear, kind, innocent M. Poincaré! Two wars and uneasy interims of anxious peace have taught us a grimmer truth. Or have they perchance blinded our eyes to the glory and the light? A simple faith, which is indistinguishable from the humility of a great spirit, lays hold, it may be, on a truth beyond the reach of the resourceful cunning of experimental intelligence. Yet we have been told otherwise by a generation of men who claim to speak in the name of science, profess love of truth above all else, and in every way mani-

fest almost fanatical devotion to Descartes' first rule of method, that we accept nothing as true which we do not clearly recognize to be so. Still, this fastidious taste for refined and purified knowledge has found no truth that beams with splendor. It is in part the effect, as it most certainly is also a cause, of disillusionment. Some have come to see, or to think they see, that moral truth is an illusion and that Poincaré was, as he suggested, simply misusing words when he used 'truth' both of science and of morals. "If one man affirms and another denies that pleasure is good *per se*, what is the difference between them? My contention is that the two men differ as to what they desire, but not as to what they assert, since they assert nothing." The words are Bertrand Russell's.(5)

Huxley is fully aware of these developments, and he is quite unable to share Poincaré's simple confidence that the scientific and the moral spirit are somehow necessarily at one. While both deny that science deals with ends, one thinks of it as dealing with means; the other thinks of it as producing power. These are the same thing, yet how different! They differ as the early and the middle years of this century; they differ as do confident hope and despair. For Poincaré, ends lie beyond the field of scientific demonstration; yet they do not, on that account, escape the grasp of reason; and he has faith that science, being rational, will naturally ally itself with the pursuit of reasonable ends generally. Huxley sees scientific knowledge as power, and rather ruefully turns to mystical religion for reassurance. Events have taught him distrust of power, and of science along with it; for, while science cannot fail to yield power, it may fail to foster an enlightened and generous spirit. It may, to be sure, perform this service, and Poincaré is one of many witnesses. But there is neither logical warrant for

asserting a necessary connection, nor empirical warrant for expecting a constant conjunction, between scientific competence and moral wisdom.

Francis Bacon himself had a moment of doubt. In the Preface to *The Great Instauration*, in the midst of preparations for the grand proclamation that "those twin objects, *human knowledge* and *human power*, do really meet in one," Bacon paused in mid-career. It was as if, in reflecting on the glories of the new age into which he was hastening his fellow man, his deepest mind had an uneasy premonition, and his unfailing pen recorded it, before purposeful attention could search out more agreeable objects. In that passing moment he addressed

one general admonition to all; that they consider what are the true ends of knowledge and that they seek it not either for pleasure of the mind, or for contention, or for superiority to others, or for profit, or fame, or power, or any of these inferior things; but for the benefit and use of life; and that they perfect and govern it in charity. For it was from lust of power that the angels fell, from lust of knowledge that man fell; but of charity there can be no excess . . .

His misgivings were apparently not deeply felt. Bacon proceeds at once to declare that he is "laboring to lay the foundation, not of any sect or doctrine, but of human utility and power." That easy, carelessly optimistic juxtaposition of utility and power, as if they go inevitably together, was immeasurably prophetic. It is a cardinal metaphysical fallacy of modern industrial society. Do men, already fallen through lust of knowledge, have nothing to fear from lust of power? If knowledge and power do really meet in one, can we discount the risks of power and prove a necessary connection between knowledge and utility?

It is Huxley's opinion that we cannot. But many would remain unpersuaded, especially in view of the fact that

Huxley proposes mysticism as the alternative to the scientific direction of life. They would complain, not without reason, that he has given a distorted picture of science and its potentialities, and has charged against it evils which result from men's acting in almost wilful ignorance of the clues science affords to a better life. As undisturbed by the events of the past decades as by pessimistic strictures like Huxley's, they retain their faith in the saving grace of natural science. Common arguments to justify it fall readily into three classes. (a) Some claim that the *results* or conclusions of science define norms of moral action, even including man's chief end. (b) Some conceive of scientific *method* as the sole intelligent way of dealing with our problems of all kinds, and conclude that the only ultimate hope of improving our human lot lies in the extended use of scientific methods; since it may be taken as axiomatic that life cannot be well lived if unintelligently lived. (c) The third class of arguments for a faith in the utility of the powers conferred by scientific knowledge, is based on a markedly different analysis of the scientific mind or *attitude* from Huxley's. It is pointed out that scientific inquisitiveness naturally demands for its satisfaction the most scrupulous disinterestedness and objectivity of mind, the most unqualified respect for facts, irrespective of our desires. These clearly being features no less indispensable to moral integrity than to cognitive fidelity, it is forthwith inferred that the scientific attitude is an essential condition of the moral conduct of life.

None of these arguments is satisfactory. Their flaws, however, are instructive, for they point to a familiar distinction, which has been neglected at the cost of considerable confusion. The kind of knowledge which serves wisdom must be clearly conceived and distinguished from the kind which

tends to generate techniques. Philosophical understanding of man and the world in which he finds himself immersed has a special purpose not to be fully satisfied by the scientific articulation of perceptual matters of fact. Clarity will hardly be achieved as long as so vital a distinction is passed over or obscured. Huxley himself is, it seems, a case in point. He offers us but two alternatives: either science or religious mysticism. By implication, he apparently agrees with scientism in the identification of all reasoned knowledge with the positive sciences.

Our tradition recognizes the further alternative of Reason. Reason is no less loyal than scientific understanding to ideals of logical and empirical integrity, but it is also loyal to the ideals of Beauty and Goodness, as ultimately inescapable aspects of an adequate ideal of Truth. This is too large and difficult a theme to be treated in this narrow context. It will be enough here, if we succeed in showing that the weakness of the scientistic arguments points toward the vital persistence of the tradition of humanistic reason.

(a) The argument from the results of science attempts to convince us that some facts of positive science possess intrinsic ethical meaning, which is objective in the same sense as its factual content. It has been made familiar by the many discussions, popular or technical, which begin by tacitly or openly identifying evolution and progress, and end by claiming that the "upward" course of evolution points the way to our true good. Or the argument may take a more piecemeal form, identifying empirically determined optimum or normal values (e.g., 98.6° F., the normal oral temperature for the human body) with ethical norms.

This latter argument lies near at hand wherever the "right" amount of any factor has been determined objec-

tively for given circumstances. If under such circumstances we wish to do the "right" thing, it seems obvious that we must provide the "right" amount of the factor in question. Scientific results thus have intrinsic ethical significance. A useful example of this sort of argument has been provided by the English geneticist, C. H. Waddington. He considers as ethical judgments statements such as "'You are an animal of such a kind that you must consume 7 mgm. of vitamin C *per diem*, and should consume 100 mgm.'," and contends that they are "statements of the same kind . . . as scientific statements." (6) Waddington's purpose, at this point, is primarily to discredit the idea that ethical judgments are *nothing but* disguised commands. In this he may have succeeded, but he does not prove the conclusion that ethical and scientific statements are of the same kind. If this were correct, scientific investigation would be a substitute for ethical reflection—and the pharmacopoeia a book of wisdom?

The example before us is manifestly a case of the hypothetical imperative: *If you desire A, then you must adopt B as a minimum, and should adopt C as an optimum means.* This has a scientific content, the reference to the fact that *B* (or *C*) will generally produce *A*, other things being equal. It does not imply that *A* is ethically *desirable*. The suggestion that it does involves an *ignoratio elenchi*. The argument shows only that ethical judgments make use of scientific knowledge, but not, as it ought, that its ethical content has scientific warrant. To prescribe an adequate diet for, let us say, the inmates of an insane asylum, it is useful to know how much vitamin C they need. Does this help us to decide whether the insane (and other socially useless individuals) should be kept alive at all? The specific problem of the man of science is to find a reliable average

dose, minimum or optimum. The research which yields an answer to that problem does not prove that 'you', the particular individual who you are, 'must' or 'should' take this amount or that. Ethically, each case may be a special case; ethically, there may be some who should not take the optimum or even the minimum dose prescribed by the scientific rule. The undisputed cognitive generality of the rule does not entail deliberate application to every individual, unless the unique value of each individual is independently assumed. Science characteristically considers, and treats, the individual as a "case", an instance of a possible law. Ethical judgment, on the other hand, takes an interest in a scientific generalization only if it shows how to help an individual. The contrast is ineradicable and crucial.

The argument which finds in evolution the clue to a scientifically respectable definition of the good suffers from essentially similar defects. It confuses the determination of a fact with the evaluation of its moral significance for ourselves, and attaches no value to the individual man, since individuals have no biological significance save as bearers of the evolutionary process. It, nevertheless, has special interest because it exposes these difficulties on a cosmic scale and makes its metaphysical assumptions unmistakable.

The kind of argument in question is familiar. The course of evolution, taken on the whole or as a whole, manifests a single trend from less to more comprehensive life. Scientists have painstakingly traced it from the simplest protozoa to the highest civilized societies (which, biologically considered, represent only a further evolutionary stage of organic life). This great fact, the central fact for all biology, is supposed to provide an empirical, objective conception of the good, free from taint of personal bias, prejudice, and arbitrary preference.

Let us pass over the doubt that freedom from bias is to be bought so cheaply, and attend to the serious ambiguity of the argument. It does not make clear whether it assumes that the trend of evolution is good because it is a fact or is a fact because it is good. It cannot have it both ways. It must assume either that the good is *effected* in the course of evolution or that it is *effective* in it. But neither alternative is satisfactory. In the former case, we are required to admit the actual tendency of the evolutionary process to be good, whether or not it *seems* so to anybody. Thus we must adopt a sort of naturalistic scotism, piously accepting (on unempirical grounds of faith) that what evolved must be good because it has evolved. If we accept the other alternative, namely, that what evolves must have evolved because it was good, or for the sake of the good, then we are committed to assigning a decisive role to purposive choice and discriminating evaluation in the evolutionary process. The good, whether immanent or transcendent, could not otherwise be effective. A correct scientific understanding of evolutionary facts, therefore, would depend on a sound sense of values, and not the reverse, as the argument requires.

The evolutionary argument distorts what may be an important truth. It seems to presuppose that good purposes tend to succeed and to shape the ultimate course of human events. But it should not be overlooked that this is a synthetic proposition. That well-being attends goodness (incidentally, a major thesis of Plato's *Republic*) is empirically meaningful only if goodness is somehow identifiable independently of a historical fact about it. Ultimately, we cannot regard ethical judgments as nothing but a peculiar type of scientific statement.

(b) The argument from method is drawn from a peculiar emphasis on the art of experiment as the best, if not sole,

intelligent way to go about the accomplishment of our purposes. It is the only flexible, self-correcting, deliberate, planned and organized way men have found to meet their difficulties and solve their problems. In the final analysis, we are told, even theoretical problems are practical, requiring for their solution the invention or discovery of methods which actually remove the difficulty. Life itself is a prolonged practical problem, made up of countless detailed, sometimes difficult, adjustments to an ever-changing natural and (in the case of men) social milieu. Each difficulty must be removed in succession as the organism, or man, achieves balanced interaction with his environment. When this occurs, the difficulty no longer exists, no matter how the result came about. The individual may have acted blindly, routinely, or frantically. Or he may have proceeded intelligently to analyse the situation, to project imaginatively the probable outcome of certain possible lines of action, and to put the most promising plan or hypothesis to the test of actual experience. The 'right' plan will show itself by restoring easeful equilibrium. If such, as we are told, is the nature of intelligence, then unintelligent behavior must be the only alternative to the scientific direction of life. Now, as John Dewey has put it, "To claim that intelligence is a better method than its alternatives, authority, imitation, caprice, and ignorance, prejudice and passion, is hardly an excessive claim."⁽⁷⁾ So much granted, the conclusion of the argument from method follows irresistibly: Science is the great guide of human life. Thus is Bacon's vision vindicated in sophisticated terms of modern self-conscious experimentalism.

Let us protect ourselves against the persuasive charm of these thoughts by recalling Huxley's antithetical conclusion. Are both sides speaking of the same thing, when one claims

that science alone can save us, while the other warns that science alone (by itself) will mislead us? Huxley seems to have in view primarily the science of the physicists, the chemists, and so on. The other side (let us call it "instrumentalism") speaks of this also, but only as a special case of the general method of intelligence. The issue thus seems to turn on what is assumed in the idea of intelligence by instrumentalism.

Almost by definition of instrumentalism, intelligence is instrumental to the natural ends of life. It is a means, and the critic can try for a quick victory by urging that the elaboration of means in science and technology is not the same as the clarification of ends. "Power is not the same thing as insight." It, nevertheless, is premature to celebrate victory. For the instrumentalist will reject what he considers an arbitrary confinement of the range of intelligence. His analysis shows him that the same experimental approach which perfects means also purifies our ends. If we endeavor after inferior things, the test of action will school us. Nature will teach whether the outcome really satisfies, or not,—whether an harmonious equilibrium actually prevails in nature. This, it will be added, triumphantly, is the only way we have of intelligently enriching our perception of the good. A good that cannot be known as an enrichment of experience is no good at all, but an illusion. Real or true goods are those that may be actually won. Life demands of us an ever-enlarging repertory of methods of concretely achieving detailed goods in existence. Moreover, each new end achieved becomes an incentive, a means to further accomplishment. New goods become practical possibilities. Thus, the scientific method of trying things out and judging carefully the results is the condition of a genuine growth in wisdom, and the only condition within our

power. It may be that wisdom may also be conferred, as by an act of divine grace. Grace is not commanded; what is in our power is to seek. Instrumentalism has the faith that if we seek, we shall find.

Here is truth which "beams with splendor." To neglect it, as does Huxley, is to lose a treasure. But a nagging doubt remains. If science is the method of this liberating intelligence, why is it that its triumphal advance in the modern age has been attended by such aggravated evils?

For this, too, instrumentalism has a ready answer: the methods of intelligence have not been widely applied. Science has grown rapidly, and has released the constructive forces in the modern world. Old institutions and bad habits survive the change. They, not having been touched by scientific reform, are responsible for the spreading evils of the modern world.(8) We need more intelligence, not less.

Are we really entitled to hold both that science has transformed modern life and that it has not affected some institutions, like capitalism? Are we really able to believe these institutions have been perpetuated by unintelligent men acting without advice from the sciences? The leaders of the world generally know quite well what they want. A generous mind may, no doubt, find their ends cramped, even injurious to their fellow men. Just the same, they make use of the sciences, but not without concessions to a prior commitment. This retards the growth of adequate moral purposes. Ultimately, it may be, these men are unwise; but that does not mean that they do not proceed deliberately and experimentally with objective methods. There is a distinction between science with and without a prior commitment, between an interested and a disinterested experimentalism. Bacon's contrast of experiments of light with experiments of fruit herein acquires its full significance. Ideally,

the scientist in his own field always wants to know more and better. When interested motives come into play, people generally cease to *desire* to know better—not at the risk of what they prize. Their weakness is not the lack of method, in the sense of technique, but want of an educated will or conscience. The critical factor thus turns out to be, not method as program or plan of action, but method as policy, attitude, or frame of mind and will.

This brings to light, at last, the true character of the disagreement between Huxley and these friends of experiment. We saw that Huxley distrusts science because of the attitude of mind it fosters. Instrumentalism trusts the scientific frame of mind because it tacitly identifies it with a moral attitude of will. Dewey himself has described the experimental method as the method “of a positive toleration which amounts to sympathetic regard for the intelligence and personality of others, even if they hold views opposed to ours, and of scientific inquiry into facts and testing of ideas.”(9) The argument from method rests upon the argument from attitude.

(c) If the attitude of positive toleration is decisive, a good method must presuppose a good will. A good will may be conceived to be one that relates itself affirmatively to all beings who enjoy a personal mode of existence. It is the attitude of a person using all his powers actively, to do his part, large or small, toward sustaining a harmony of personal life. This attitude involves both toleration and respect for personal existence as such. That is to say, it is both disinterested and personal. It is disinterested in the sense that all private and merely individual inclinations and ambitions are subordinated to a universal vision. It is personal in the sense that in any actual situation the controlling ends of action are persons. In the moral attitude

the agent relates himself to others as subject to subject, not as subject to object, to borrow A. A. Bowman's expression.

The scientific attitude is disinterested, but it is *impersonal*. Therein lies its great strength, that it ignores final causes; and its weakness, for it ignores the moral ends of action. It converts whatever it touches into objects and subordinates every other concern to its ambition to determine, if not the sum of all matters of fact, at least the grand order of nature. And so it is that men of science, whose minds are more habituated to processes of objective inquiry than to those of critical reflection, sometimes overlook the personal dimension of life and, on grounds of disinterestedness alone, attribute to the scientific attitude virtues which can belong only to the moral person.⁽¹⁰⁾ It is easy to forget the abstractness of specifically scientific inquiry. So far we may follow Huxley's lead.

On the other hand, an equally grave complementary error, indeed a double error, is also possible; for we may carelessly conclude that all morality falls like a ready-made thing in the bare will, and all intelligence falls on the side of science. That would, as Huxley does, make the will intellectually irresponsible and science morally irrelevant. It would then be impossible to understand either how Socrates could have thought that virtue is knowledge, or how more recent thinkers could believe that the scientific is the moral attitude, or that knowledge is virtue. It thus seems necessary to hold, on the one hand, that the scientific attitude at its best includes, as one of its necessary conditions, a kind of self-control which is unmistakably moral or akin to the moral, and, on the other hand, that a personal life must include the utmost possible development of intelligence.

The argument from scientific attitude or scientific method is plausible just to the extent that it relies on what this

attitude borrows from and contributes to genuine morality. What it contributes is, first of all, a dispassionate habit of mind; second, a habit of free, self-disciplined association with others in a community defined by devotion to a common ideal (truth); and, third, an enhanced ability to recognize one's actual situation and opportunities for purposes of moral judgment. These contributions have often been praised, and their value is beyond dispute. Any sensitive morality, as Dewey has so rightly taught, will welcome all objective aids and refreshments.

But the scientific attitude also *borrow*s something. When, for example, Hocking says of the empirical study of nature that "It meant keeping man's self-interest and self-importance rigorously out of his study of nature's ways. Modern science . . . is founded on a methodical unselfishness,"⁽¹¹⁾ he echoes Bacon's declaration:

For my own part at least, in obedience to the everlasting love of truth, I have committed myself to the uncertainties and difficulties and solitudes of the ways . . . in the hope of providing at last for the present and future generations guidance more faithful and secure. Wherein if I have made any progress, the way has been opened to me by no other means than the true and legitimate humiliation of the human spirit. (12)

This means that science has borrowed its inspiration partly from that deep awe and unrest which reflects man's need to understand his ultimate condition, and partly from general humanitarian motives. The latter appear to be the social form, peculiarly modern, of the moral concern; the former can be divorced with difficulty, if at all, from a final religious reference. This joining together of religion and morality and reason is one of the deepest and most creative Western traditions, which attained philosophical expression for the first time through Socrates and Plato, was spiritually deepened by the influence of Christianity, inspired the first

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stages of modern science, and continues to speak through the mouths of men like Poincaré—and Dewey. According to this tradition, the aim of knowledge is truth, and its results are wisdom and righteousness. This is the classic tradition in which virtue is self-knowledge, and wisdom is sought as a form of moral perfection. But about the positivistic temper of industrialized modern science, Huxley is right. It belongs to another tradition, in which knowledge is power, a temptation rather than a victory.

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NOTES

1. Harper & Bros., 1946.
2. *The Value of Science*, from *Foundations of Science*, p. 206.
3. *Op. cit.*, p. 205.
4. *Op. cit.*, pp. 205-206.
5. See his "Reply to Criticisms," in *The Philosophy of Bertrand Russell*, P. A. Schilpp, ed., Northwestern University Press, 1944, p. 720.
6. *Science and Ethics*, 2nd ed., p. 10. Geo. Allen & Unwin, 1944.
7. *Experience and Nature*, p. 437.
8. Dewey's *Liberalism and Social Action*, 1939, may be cited as one of the more extensive elaborations of this idea.
9. Dewey and Tufts: *Ethics*, revised ed., p. 365.
10. C. H. Waddington once again supplies an example, his Pelican Book, *The Scientific Attitude*, being a full-length illustration of this. This point of view is an idiosyncrasy neither of the person nor of the particular historical moment, for it is no less fundamental to the first chapter of Karl Pearson's *The Grammar of Science*, published two generations ago. Nor is Waddington alone today.
11. "What is Man?," in *Preface to Philosophy*, Macmillan, 1946. P. 26.
12. Preface, *The Great Instauration*.